Claims:

1. A method for registering images, comprising the steps of:

receiving a first image and a second image, said first image and said second image including three-dimensional data sets;

globally transforming said second image via a rigid transformation techniqu;

locally transforming said first image via an iterative motion tracking technique; and

outputting a registered image.

2. The method of claim 1, wherein said globally transforming includes the steps of:

constructing a first pyramid for said first image;

constructing a second pyramid for said second image;

determining a set of optimal scale factors;

performing a uniform scaling on said second image in accordance with said set of optimal scale factors to obtain a rescaled second image;

determining a set of optimal translation and rotation parameters; and

performing a transformation on said rescaled second image based on said set of optimal translation and rotation.

3. The method of claim 2, further comprising the step of:

reconstructing said second pyramid after said uniform scaling step.

4. The method of claim 2, wherein said determining a set of optimal scale factors includes the steps of:

determining a first voxel size in said first image;

determining a second voxel size in said second image; and

constructing a scaling matrix based on said first voxel size and said second voxel size.

5. The method of claim 2, wherein said determining a set of optimal scale factors includes the steps of:

segmenting a first anatomical structure in said first image;

segmenting a second anatomical structure in said second image;

determining a first largest span in said first anatomical structure;

determining a second largest span in said second anatomical structure; and

constructing a scaling matrix based on said first largest span and said second largest span.

6. The method of claim 2, wherein said determining a set of optimal translation and rotation parameters includes the steps of:

segmenting a first anatomical structure in said first image to obtain a first map;

segmenting a second anatomical structure in said second image to obtain a second map;

identifying a first set of identifiable points or contours in said first map and a second set of identifiable points or contours in said second map;

constructing a transformation matrix based on said first set of identifiable points or contours and said second set of identifiable points or contours; and

transforming said second image in accordance with said transformation matrix to obtain a transformed second image.

7. The method of claim 6, further comprising the step of:

subsampling said first image and said second image based on said first map and said second map.

8. The method of claim 6, further comprising the steps of:

measuring an error between said transformed second image and said first image;

comparing said error to a threshold error; and

repeating said identifying step if said error is greater than said threshold error.

9. The method of claim 6, further comprising the steps of:

measuring an error between said transformed second image and said first image;

comparing said error to a previous error; and

repeating said identifying step if said error is greater than said previous error.

10. The method of claim 1, wherein said locally transforming said first image and said second image includes the steps of:

selecting a set of feature points in said first image;

performing a feature tracking process on each of said set of feature points; and

performing a transformation weighting process on each point in said first image that is not a feature point.

11. A computer program product to use in conjunction with a computer system for registering multiple images, comprising:

logic code for receiving a first image and a second image, said first image and said second image including three-dimensional data sets;

logic code for globally transforming said second image via a motion tracking technique;

logic code for locally transforming said first image via an iterative motion tracking technique; and

logic code for outputting a transformed first image and a transformed second image.

12. The computer program product of claim 11, wherein said logic code for globally transforming includes:

logic code for constructing a first pyramid for said first image;

logic code for constructing a second pyramid for said second image;

logic code for determining a set of optimal scale factors based on said first pyramid and said second pyramid;

logic code for performing a uniform scaling on said second image in accordance with said set of optimal scale factors to obtain a rescaled second image;

logic code for determining a set of optimal translation and rotation parameters; and

logic code for performing a transformation on said rescaled second image based on said set of optimal translation and rotation.

13. The computer program product of claim 12, further comprising logic code for reconstructing said second pyramid after said uniform scaling.

14. The computer program product of claim 12, wherein said logic code for determining a set of optimal scale factors includes:

logic code for determining a first voxel size in said first image;

logic code for determining a second voxel size in said second image; and

logic code for constructing a scaling matrix based on said first voxel size and said second voxel size.

15. The computer program product of claim 12, wherein said logic code for determining a set of optimal scale factors includes:

logic code for segmenting a first anatomical structure in said first image;

logic code for segmenting a second anatomical structure in said second image;

logic code for determining a first largest span in said first anatomical structure;

logic code for determining a second largest span in said second anatomical structure; and

logic code for constructing a scaling matrix based on said first largest span and said second largest span.

16. The computer program product of claim 12, wherein said logic code for determining a set of optimal translation and rotation parameters includes:

logic code for segmenting a first anatomical structure in said first image to obtain a first map;

logic code for segmenting a second anatomical structure in said second image to obtain a second map;

logic code for identifying a first set of identifiable points or contours in said first map and a second set of identifiable points or contours in said second map;

logic code for constructing a transformation matrix based on said first set of identifiable points or contours and said second set of identifiable points or contours; and

logic code for transforming said second image in accordance with said transformation matrix to obtain a transformed second image.

17. The computer program product of claim 16, further comprising:

logic code for subsampling said first image and said second image based on said first map and said second map.

18. The computer program product of claim 16, further comprising:

logic code for measuring an error between said transformed second image and said first image;

logic code for comparing said error to a threshold error; and

logic code for repeating said identifying step if said error is greater than said threshold error.

19. The computer program product of claim 16, further comprising:

logic code for measuring an error between said transformed second image and said first image;

logic code for comparing said error to a previous error; and

logic code for repeating said identifying step if said error is greater than said previous error.

20. The computer program product of claim 11, wherein said logic code for locally transforming said first image and said second image includes:

logic code for selecting a set of feature points in said first image;

logic code for performing a feature tracking process on each of said set of feature points; and

logic code for performing a transformation weighting process on each point in said first image that is not a feature point.